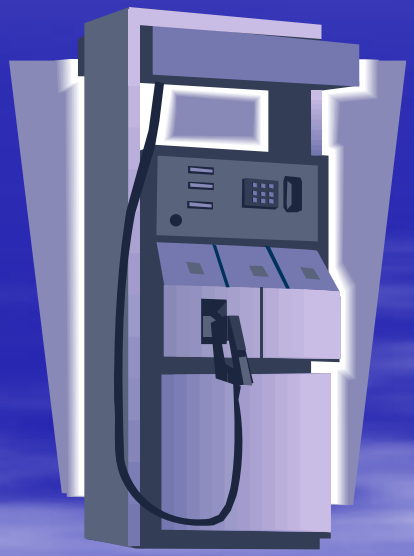
Gasoline Dispensing Facility (GDF) Hose Regulation Workshop



July 2, 2008

California Air Resources Board (ARB)

Presentation Outline

1. Workshop Objective
2. GDF Hose Background
3. Recent Progress
4. Next Steps
5. Projected Timeline
6. Comments & Contact Information

Workshop Objective

- Update stakeholders on ARB progress toward a regulation to limit the emissions from GDF hoses
  - Currently, there is no regulatory standard for emissions from GDF hoses in California

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GDF Hose Background

- California Certification Requirements
- Vapor Recovery Hose Design
- Hose Permeation Testing Issues
- Previous ARB Hose Testing

GDF Hose Background

California Certification Requirements

- ARB certifies Enhanced Vapor Recovery (EVR) systems for dispensing gasoline at GDFs in California
- EVR systems require the use of vapor recovery hoses

GDF Hose Background

Vapor Recovery Hose Design

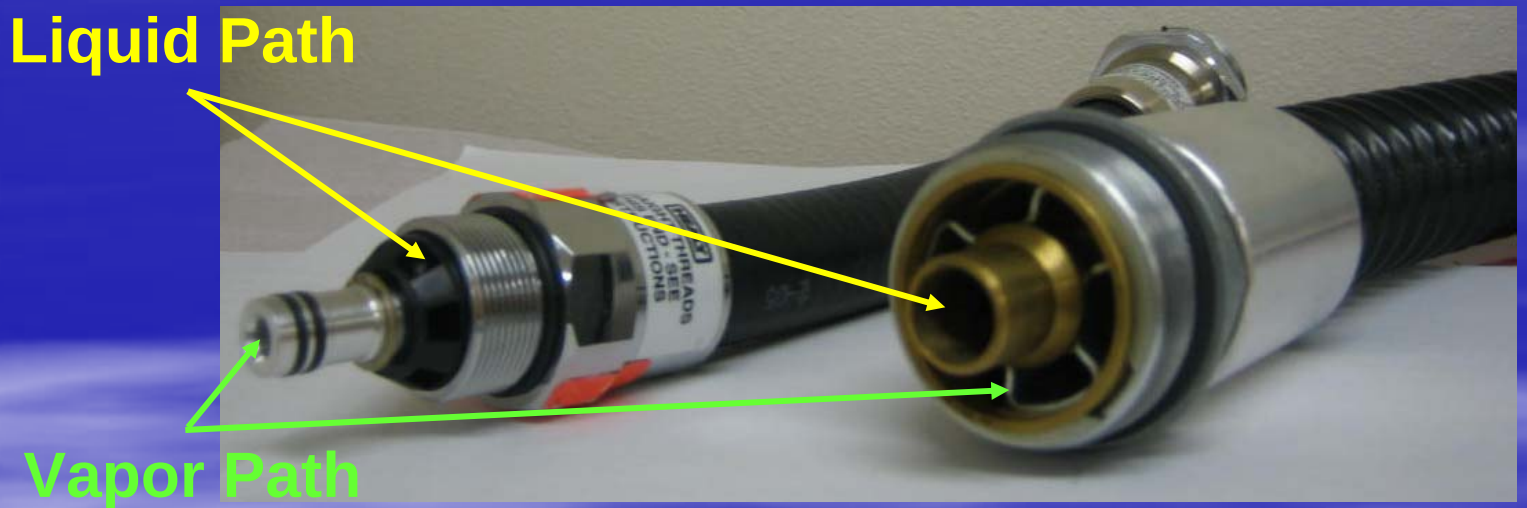
- GDF vapor recovery hoses differ from other types of fuel hose in that they are co-axial, or have two paths, to allow for vapor recovery during fueling

GDF Hose Background

Vapor Recovery Hose Design

(Continued)

- There are two configuration types of GDF vapor recovery hose



Vacuum Assist Hose

Balance Hose

GDF Hose Background

Hose Permeation Testing Issues

- Due to the coaxial design of GDF hoses, current fuel hose permeation test standards may require modification
- Balance hoses present an additional hurdle due returning vapors using the outer path
  - Studies published by the Society of Automotive Engineers suggest that a saturated vapor and a liquid permeate at approximately the same rate
    - See SAE Tech Papers: 2000-01-1096, 2001-01-1999, 981360, and 06SETC-92

GDF Hose Background

Previous ARB Hose Testing

- In 2004, ARB conducted testing to determine permeation rates of vapor recovery hoses
- The observed permeation rates using California summertime pump fuel at an average temperature of 69 °F were:
  - 53 g/m^2/day for vacuum assist hose
  - 23 g/m^2/day for balance hose

GDF Hose Background

Previous ARB Hose Testing

(Continued)

- Staff believes these numbers underestimate actual rates due to fuel degradation
- For more details, see full report posted at: http://www.arb.ca.gov/vapor/gdfhe/gdfpermreport07.pdf

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Recent Progress

- 2008 ARB GDF Hose Testing
- Analysis of Balance Hose Vapor Quality
- Re-evaluation of Hose Population
- Re-evaluation of Hose Upgrade Cost
- Re-evaluation of Emissions Estimates
- Development of a Hose Certification Test Procedure
- Development of Emissions Control Strategy
- Re-evaluation of Cost-Effectiveness

Recent Progress

2008 ARB GDF Hose Testing

- In 2008, ARB conducted testing of balance style vapor recovery hoses to determine the saturated vapor permeation rate
- The observed permeation rate using California summertime pump fuel at an average temperature of 71 °F was 104 $g/m^2/day$

Recent Progress

2008 ARB GDF Hose Testing

(Continued)

- For more details, see full report posted at: http://www.arb.ca.gov/vapor/gdfhe/arb_gdf_balancehose_permeation_report_08_posted.pdf

Recent Progress

Analysis of Balance Hose Vapor Quality

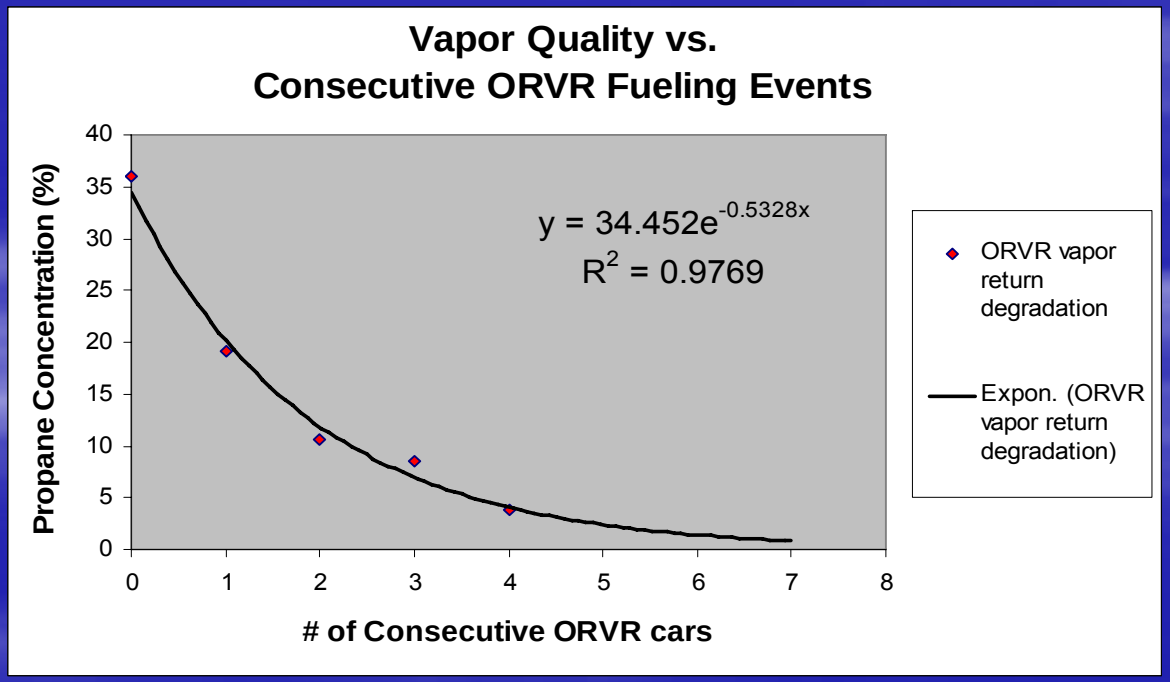
- ARB staff assumes the vapor that is returned from a conventional vehicle gasoline tank through the vapor path of a balance hose is a saturated vapor at that moment
- Staff used vapor quality measurements from a 2007 EVR certification 200 car test (Test Report Number 07-01) to observe vapor quality changes over time

Recent Progress

Analysis of Balance Hose Vapor Quality

(Continued)

- The data shows a strong correlation between consecutive On Road Vapor Recovery (ORVR) fueling events and drop in return vapor quality



Recent Progress

Analysis of Balance Hose Vapor Quality

(Continued)

- From the 200 car test data, the dependence on ORVR vehicle populations, and ARB 2008 test results showing the permeation rate of a saturated vapor, staff predicts the average permeation rate of balance hoses in 2013 will be 26 $g/m^2/day$
- Detailed analysis will be posted by August 2008 at: http://www.arb.ca.gov/vapor/gdfhe/gdfhe.htm

Recent Progress

Re-evaluation of Hose Population

- In 2008, ARB conducted a survey of California air quality management districts
  - ~174,000 hoses employed at GDFs with phase II vapor recovery systems
    - 85% Balance
    - 15% Vacuum Assist
  - By 2013 ARB staff believes the population will likely be evenly split between balance and vacuum assist
- Detailed results of survey will be posted by August 2008 at: http://www.arb.ca.gov/vapor/gdfhe/gdfhe.htm

Recent Progress

Re-evaluation of Hose Upgrade Costs

- In 2007 ARB conducted a survey of hose manufacturer's to determine the cost increase to upgrade GDF hoses with low permeation technology

- Upgraded hose survey parameters:
  - The hose is ~ 10 ft long
  - The maximum permeation allowed is 5 g/m^2/day
  - The constant testing temperature is 40 °C
  - The test fuel is CE-10

Recent Progress

Re-evaluation of Hose Upgrade Costs

(Continued)

- The average cost increases were as follows:
  - $10 for conventional and vacuum assist hose
  - $29 for balance hose

- For more details, see full report posted at: http://www.arb.ca.gov/vapor/gdfhe/GDF_hose_upgrade_cost_report_draft.pdf

Recent Progress

Re-evaluation of Emissions Estimates

- 2013 GDF hose emissions estimates:
  - 1.7 tons/day of volatile organic compounds
- Assumptions:
  - 2008 hose population estimate
  - ARB 2004 and 2008 testing results
  - 2008 balance hose vapor quality analysis
  - Detailed analysis will be posted by August 2008 at: http://www.arb.ca.gov/vapor/gdfhe/gdfhe.htm

Recent Progress

Development of a Hose Certification Procedure

ARB staff has been working with Underwriter's Laboratory to develop a hose permeation test procedure since early 2007

– Other participants in this process include hose manufacturers, material manufactures and EPA

Underwriters Laboratories

Recent Progress

Development of a Hose Certification Procedure

(Continued)

- UL 330, a standard for Hose and Hose Assemblies for Dispensing Flammable Liquids currently has no permeation limits
- By working with UL to augment UL 330 to contain a performance standard for gasoline permeation, ARB hopes to:
  - Ease the certification process for manufacturers
  - Create a robust test procedure through stakeholder participation

Recent Progress

Development of a Hose Certification Procedure

(Continued)

- Multiple samples of low permeation GDF hose have demonstrated permeation rates of less than 10 g/m^2/day at 38°C using CE-10 test fuel
- Validation of the test procedure with UL is projected to be finalized by the end of the summer

Recent Progress

Development of Emissions Control Strategy

- ARB staff intends to incorporate a low permeation GDF hose performance standard into CP-201, ARB's Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities

- Staff intends the permeation rate to be measured in accordance with UL 330 X.X (to be determined) and shall be less than 10 $g/m^2/day$

Recent Progress

Development of Emissions Control Strategy

(Continued)

- Staff intends that the hose permeation test results be submitted directly to ARB without prior review by the submitting manufacturer
- Staff intends that low permeation hoses comply with all other relevant standards in CP-201

Recent Progress

Development of Emissions Control Strategy

(Continued)

- Staff proposes the following regulatory dates:
  - An Effective Date of October 1, 2009
    - Full compliance will be in effect 4 years from the effective date (2013)
  - An Operative Date of October 1, 2010
    - When new facilities and facilities undergoing major modifications must comply

Recent Progress

Re-evaluation of Cost-Effectiveness

- Estimated cost-effectiveness:
  - 0.73 $/lb of emissions reduced
- Assumptions:
  - Full Implementation in 2013
  - Emissions of 1.7 tons/day
  - 2008 hose population estimate of ~ 174,000
  - Gasoline savings at $4 per gallon
  - Permeation limit of 10 g/m^2/day

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Next Steps

- Finalize UL Test Procedure
- Amend UL 330 to Include Permeation
- Develop Regulatory Package
- Additional Inventory Testing

Next Steps

Finalize UL Test Procedure

- Final validation testing of the permeation procedure at UL is projected to finish by August 2008
- Results of validation testing may lead to minor revisions in the test procedure language

Next Steps

Amend UL 330 to Include Permeation

- Once the test procedure has been finalized, it will be included in a proposal to amend UL 330 and sent to the Standards Technical Panel for UL 330 (STP 330)
- STP 330 will then vote on amending the procedure into UL 330
- UL has committed to trying to have STP 330 formed and ready to evaluate the proposed amendment upon receiving it

Next Steps

Develop Regulatory Package

- In order to meet regulatory deadlines, ARB staff will generate the specific amendments to CP-201 necessary to require low permeation hoses and an Initial Statement of Reasons (ISOR) justifying the changes
- Staff intends to Workshop these documents in September

Next Steps

Additional Inventory Testing

- Staff believes that previous ARB hose testing may significantly understate the emissions from GDF hose permeation
- Although emissions that have been measured so far are sufficient to justify a regulation, Staff believes further testing will show that uncontrolled emissions from this source may be as high as 3 tons/day
- Staff intends to do more rigorous testing in 2009

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Projected Timeline

- Projected 2008 completion dates of major milestones:
  - August
    - Finalize a GDF hose permeation test procedure in cooperation with Underwriter's Laboratory
  - September
    - Begin process to amend UL 330 to include the permeation test procedure
    - Draft and Workshop the regulatory proposal
  - December 11,12
    - Present proposed regulation to the Board for consideration

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Contact Information

- For questions concerning GDF hose emissions:
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    - Project Lead, Regulation Development Section
      - (916) 322-8116, jmcphee@arb.ca.gov
  - Dennis Goodenow
    - Manager, Regulation Development Section
      - (916) 322-2886, dgoodeno@arb.ca.gov

Web Site

http://www.arb.ca.gov/vapor/gdfhe/gdfhe.htm

Comments